

## Letter from J. A. D. McCurdy to Alexander Graham Bell, November 11, 1908

Hammondsport, N. Y. Nov. 11, '08. Dear Mr. Bell,

Received your communication concerning the Wright disaster at Fort Meyers O. K. You Casy and Gardiner ha ve certainly gone over the probable caused from all sides and I don't see that there is much left for me to say.

As you state in your article, the immediate cause of this accident was loss of headway, but how was this brought about? Certainly the breaking of a propeller would not cause sudden stoppage in the air and consequently leave the machine without motion of translation.

A re ll the eye witnesses of the accident you talked with agreed that the machine first started on a gentle glide and as she gained speed, her course was diverted into an upward glide. Then the machine having lost her motion of translation turned upon end and dove.

The reason for her diving is of course, quite obvious — the center of pressure at the traveling speed comes far in advance of the geometrical center of the surface and the machine is balanced for its speed by having the center of g ravity of the machine as a whole coincident with thi s point. (center of presure).

As the machine looses head way of c o use the C. of P. recedes till when the machine has no motion of translation the center of presure coincides with the geometrical center of surface.

When the Aerodrome is flying in a normal manner the front c control no matter how large or ow powerful has no effect on the position of the center of presure loc a ted in the main plane because t the angle of incidence of the control v a ries ; at one moment it presents a negative angle of attack and the nest moment it presents perhaps a positive angle of

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attack. But when the Aerodrome has lost its medium motion of translation the front control comes into play and influences the geometrical center of surface of the machine as whole. It has been found by Mr. Chanute and others that two superposed plans separated from each other two thirds or a distance equivalent to the depth of the planes, and falling so that the the planes of the surfaces are at right angles to the line of distance decent — the top lane has 0.7 times the supporting part of the bottom plane. On this basis I have figured out the effect which would be produced in the Silver Dart. Suppose that for some reason or other motion of translation should be entirely lost while in the air. The machine would turn on end as the Wright flyer did unless the front control was dropping relatively to the air at the rate of Twenty to Thirty miles per hour. In that case the moment produced by the eccentric loading would be entirely compensated for.

This velocity is much too great for safety and I would urge that a front control be used which would be large enough or out from the main plan far enough, to thoroughly compensate for the eccentricity of loading at a speed of from 10 to 15 miles per hour. If such were the case a machine could not turn up its nose and drop unless compelled to do so by the operator.

My opinion of a rear horizontal tail is that it is a detriment in that it dampens the turning motion of the Aerodrome and while it may tend to prevent a sudden turning, it tends to depress the machine as a whole, whereas the bow of control tends to support the machine as a whole and after the turning had taken place you would have to drop much faster than without the tail in order to right the machine.

I agree with Casey that it would be well to have all the controls in front of the operator and in fact we considered putting the Silver Darts vertical rudder in front but thought that to have the same turning effect it would have to be much larger than if placed at the rear because it would not be affected by the draft from the propeller.

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The Wright disaster in my private opinion was caused either because Mr. Wright pulled the lever which elevates the machine too far or he became excited as he naturally might and pulled the lever unintentionally, hence losing his motion of translation. This is no reflection on Mr. Wright because he is with his brother beyond doubt the most skillful Aviator we have. He is but humane however, and he has been known to pull the wrong lever before

In other words, I don't see how the breaking of one propeller providing the engine was shut off instantly (comparatively speaking) could cause the Aerodrome to lose its motion of translation.

J. A. D. McC.